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Zeyer, A

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# Public Reason and Teaching Science in a Multicultural World: a Comment on Cobern and Loving: "An Essay for Educators…' in the Light of John Rawls' Political Philosophy

**Albert Zeyer**

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**Abstract** This is a comment on the article "An Essay for Educators: Epistemological Realism Really is Common Sense" written by Cobern and Loving in *Science & Education*. The skillful analysis of the two authors concerning the problematic role of scientism in school science is fully appreciated, as is their diagnosis that it is scientism not universal scientific realism which is the cause of epistemological imperialism. But how should science teachers deal with scientism in the concrete every day situation of the science classroom and in contact with classes and students? John Rawls' concept of public reason offers three "cardinal strategies" to achieve this aim: proviso, declaration and conjecture. The theoretical framework is provided, the three strategies are described and their relevance is fleshed out in a concrete example.

## 1 Introduction: Judith and the "Whole Truth" of Science

The reading of the "Essay for Educators" written by Cobern and Loving (2007) in this journal vividly reminded me of an experience I had some years ago being then a science teacher myself. A student, a clever girl, let me call her Judith, was brilliant at languages and at philosophy but she was constantly failing in science, although I was convinced that she could succeed in these topics as well, if only she wanted to. So once after a physics lesson I took her aside and asked her why she was resisting participation in science classes. She surprised me by answering: "I hate natural sciences because they always pretend to be in charge of the whole truth."

After this conversation I came to have a closer look at my students and I realized that many of them had the same problem with natural sciences. They all suspected that natural sciences wanted to claim the "whole truth", and this was a serious obstacle for them to become involved with, to learn and finally to succeed in these subjects. I began to wonder about some questions, such as "What is a whole truth?", and "Are natural sciences

A. Zeyer (✉)
Institute of Upper Secondary and Vocational Education, University of Zuerich, Zuerich, Switzerland
e-mail: albert.zeyer@access.uzh.ch

something, such as a whole truth?", or "How are we to deal with whole truths in school, especially in school science?"

I received some important answers to my questions in the reading of John Rawls, probably one of the most known political philosophers of the last century. But Rawls of course is not concerned with science education. I always missed a link to connect Rawls' concepts to our field. I think that Cobern and Loving's article provides this link. This is what I would like to outline in the following comment.

Let me first come back to Judith. During my conversations with her, she told me more about her problems with natural sciences. Her mother turned out to be a practicing therapist in homeopathic medicine and acupuncture, and her family held strong holistic views, including a decisive rejection of abortion in early pregnancy, a cultural constellation that is not unusual in our country.

The effect of science classes on Judith now became clear to me. The physics teacher mocked astrology; in biology she learnt that there is no such thing as a nerve system in an embryo of 10 weeks and that therefore abortion does not really pose a problem to ethics; and in chemistry the teacher calculated the number of medicine molecules left in a homeopathic dilution: namely zero! "In science classes I always feel dumb, like a complete fool," Judith explained to me.

## 2 Cobern and Loving's Argument

Following the argument of Cobern and Loving in their article, Judith is certainly a victim of a flourishing scientism, the myth "that scientific knowledge deserves unquestioned epistemic privilege" (p. 427), in her school culture. Her feeling of being dumb in science classes is part of the "cultural clash" she experiences with her own life-world culture. She is not alone! During the last ten years, cultural border crossing has become an issue in the research of science education (Aikenhead 2000). It has been realized, that only a small amount of students-"Potential scientists" so to speak-have identities and abilities that harmonize so closely with the culture of western science that they easily become enculturated. Most students are not that close to a scientific worldview.

But: how should we deal with concepts like homeopathic medicine or acupuncture in school science without offending and rejecting students like Judith on the one hand and without endorsing epistemological relativism, which is certainly also not desirable, on the other hand? "The problem facing TEK and other forms of indigenous knowledge, as well as other domains of knowledge, such as the arts and literature and religion, is the problem of scientism—the cultural hegemony science," write Cobern and Loving. "The problem is not that science dominates at what it does best: the production of highly efficacious naturalistic understanding of natural phenomena. The problem is that too often science is used to dominate the public square as if all other discourses were of lesser value." (Cobern and Loving 2001, p. 62) The authors conclude therefore, that there is no need for science educators to abstain from a universalist and realist stance towards science in the effort to respect a (misunderstood) multicultural approach to epistemology. "Universal scientific realism is not the cause of epistemological imperialism that is so offensive to professional educators and which drives them to relativism. Epistemological imperialism is the direct consequence of scientism."

I believe that these phrases provide the clue to understanding Judith's problem. Her problem with "science" is obviously *de facto* a problem with "scientism". Epistemological imperialism is not only offensive for educators, but first and foremost also for those students whose life-world culture is different from a scientist culture.

But again: As science educators, how should we deal with students, such as Judith? "The problem for TEK-as well as for so many other domains of knowledge—is not the exclusivity of science as per the Standard Account," write Cobern and Loving (p. 63), "but the transmogrification of science as scientism in the public square." They propose in bringing TEK (and other forms of non scientific knowledge) into the science classroom to offer students a chance "to see how the practice of science can benefit from the insights of another domain of knowledge"—however, without forgetting to declare a coherent boundary to science and school science. "That boundary excludes most forms of indigenous knowledge, if not all, just as it excludes art, history, economics, religion, and, many other domains of knowledge. Being exclusive, however, does not confer science with any privilege vis-à-vis other domains. Science is properly privileged only within its own domain for what is where its strength lies. When TEK and other forms of indigenous knowledge are devalued it is not because of the exclusive nature of the Standard account of science. It is because someone is involved in the scientistic practice of extending scientific privilege from its proper domain in science and technology into other domains. The solution is to resist this scientistic practice by emphasizing throughout schooling the concept of epistemological pluralism…" (p. 64f).

This is an extremely important and helpful statement made by the authors at the end of their article; however it leaves the crucial question somewhat unresolved: how to proceed in the concrete situation, in the classroom and in contact with classes and students in everyday life. It is at this point where I propose that Rawls' concept of public reason could provide an important clarification.

## 3 The Concept of Public Reason in the Philosophy of John Rawls

John Rawls is famous for his work on political liberalism (Rawls 1993), which plays a key role in the actual discourse of reasonable pluralism. The idea of public reason is a crucial point in it (Rawls 1999). It belongs to "a conception of a well-ordered constitutional democratic society" (ibid. p. 131). A basic feature of that kind of democracy is a reasonable pluralism, i.e., "the fact that a plurality of conflicting reasonable comprehensive doctrines, religious, philosophical, and moral, is the normal result of its culture of free institutions" (ibid).

Important in this context is the term "comprehensive doctrines". Rawls defines a comprehensive doctrine to be a doctrine that covers all the important aspects of human life on a religious, philosophical and moral level (Rawls 1993). Sometimes he also speaks of comprehensive doctrines as "to what we as individuals or members of associations see as the whole truth" (Rawls 2005, p. 225) and maintains that there are comprehensive doctrines of different kinds, such as religious and philosophical ones.

Comprehensive doctrines have three main features. In covering major religious, philosophical, and moral aspects of human life, they are an exercise of theoretical reason. In singling out which values to count as especially significant and how to balance them when they are in conflict, they are also an exercise of practical reason. The third feature is that they are not necessarily fixed and unchanging, but normally belong to a tradition of thought and doctrine. Rawls also uses the term of "secular philosophical doctrines" (Rawls 1999, p. 148) to contrast religious comprehensive doctrines with theories of first philosophy and moral doctrine, and he points out that there is no substantial difference in his treatment of religious and secular comprehensive doctrines.

Comprehensive doctrines may be conflicting, even though they are reasonable. This may sound strange in the ears of people, who "struggle to win the world for the whole truth" (ibid., p. 132), as Rawls calls it. They believe in the one and only whole truth, which can be found out and defended by reasoning. For a liberal democracy however, the coexistence of conflicting, though reasonable, truths is a basic fact. "Citizens realize that they cannot reach agreement or even approach mutual understanding on the basis of their irreconcilable comprehensive doctrines." (ibid).

Central to the idea of public reason is that comprehensive doctrines of truth or right are replaced by an idea of the politically reasonable. Public reason "neither criticizes nor attacks any comprehensive doctrine, religious or nonreligious, except insofar as that doctrine is incompatible with the essentials of a democratic polity" (ibid., p. 132).

Rawls places particular emphasize on the fact that the idea of public reason "does not apply to all political discussions of fundamental questions, but only to discussions of those questions in what I refer to as the public political forum" (ibid., p. 133). In the strictest form, the public political forum confines itself to three parts: the discourse of judges in their decisions, the discourse of government officials and the discourse of candidates for public office. Moreover, the public forum is realized by citizens who—when voting—view themselves as ideal legislators and hold government officials to the idea of public reason. Furthermore, public reason is at stake in institutions belonging to the so-called basic structure. We shall come back to this point later on.

Rawls contrasts the public forum with the so-called background culture. This culture includes the cultures of churches and associations of all kinds, universities, professional schools, scientific and other societies. In background culture, the struggle between different comprehensive doctrines is normal. But this is not the case in the political forum.

Comprehensive doctrines—religious or secular—do not provide public reason. However, this does not mean that they should be completely excluded from the public forum. Instead, Rawls proposes a kind of "assurance" against their overtaking the public discourse when they refer to the "whole truth". He calls this assurance the proviso. This term means that "reasonable comprehensive doctrines, religious or nonreligious, may be introduced into public political discussion at any time, provided that in due course proper political reasons—and not reasons given solely by comprehensive doctrines—are presented that are sufficient to support whatever the comprehensive doctrines are said to support" (ibid., p. 152). In other words, comprehensive doctrines may provide conceptual ideas at any time. The proper argumentation however must remain on the level of public reason.

However, there are two more forms of discourse by which comprehensive doctrines may be introduced into public reason. One is declaration. "Here we each declare our own comprehensive doctrine, religious or nonreligious. This we do not expect to share" (ibid., p. 155). The second form is conjecture. "We argue from what we believe, or conjecture, are other people's basic doctrines, religious or secular, and try to show them that, despite what they may think, they can still endorse a reasonable political conception…" (ibid).

## 4 What Could This Mean for Teaching Science?

To link this conceptual framework to the pluralistic concept of science education forwarded by Cobern und Loving, we only need to realize that scientism is an example for a comprehensive doctrine in the Rawlsian sense. It claims *per definitionem* to provide superior answers to most aspects of human life in terms of science and it denies that other cognitive processes than science can contribute towards theoretical and practical reasoning.

It is important to make a difference between science itself, which is not a comprehensive doctrine, and scientism, which is one. Scientism creates a comprehensive worldview out of non-comprehensive scientific knowledge.

Rawls' concept of public reason is not only consistent with Cobern and Loving's proposal of an epistemological pluralism in (science) class rooms, but in fact it even broadens the horizon of this approach. When scientism is considered in terms of a comprehensive doctrine, then it is not only a problem on the epistemological level. Its relevance is then not only confined to questions of truth but also includes ethical/moral and sometimes even esthetical issues. This seems to be an interesting consequence of a Rawlsian point of view, because we know that the cultural clash between students and scientist teachers often happens not only on the epistemological level, but quite frequently also on the level of ethical-practical reasoning. The idea of public reason underlines this important aspect of cultural clashes in science class rooms.

What is the consequence if we accept debate and discourse in the public domain as a model for the science classroom? A science teacher should accept the proviso, i.e., he or she should not support scientistic practice in the classroom—neither on the epistemological level (as forwarded by Cobern and Loving) nor on any other level of theoretical and practical reasoning. The avoidance of scientism does not "only" become an epistemological issue, but also one of applied ethics in science education.

It is important to realize that the proviso does not hold for the scientific approach itself. The teacher may use any "free-standing argument" (Pauer-Studer 1999, p. 378) coming from science, i.e., scientific reasoning, but not from scientism. Scientists may provide acupuncturists with physical facts on energy and energy transport. They may confront homoeopathists with calculations concerning dilution factors in their pharmaceutical solutions. Yet these arguments should be used without comprehensive implications and without attacking other doctrines as futile and wrongheaded. Scientists may argue in the case of abortion that—from a scientific point of view—the nervous system of a 10 weeks old embryo is not ripe enough to feel pain. But they must not persist on the scientistic conclusion, that "therefore" abortion in early pregnancy is unproblematic. Or else they have to declare their scientist standpoint and to distinguish it openly and clearly from a proper scientific position.

If a teacher does not do so, he or she has to accept that a student like Judith conjectures this standpoint as a scientistic one and thus not only defends herself against indoctrination in a comprehensive scientistic worldview, but also against the teacher's claim that—as a scientist—he or she is in charge of the "whole truth".

Adapting Rawls' idea of public reason in this way enables us to model the classroom on the public forum. Any partner, be it a teacher or a student, should accept Rawls' rules for public discourse. A science teacher or a student may declare their arguments to be embedded within a scientific worldview or make a conjecture about the worldview of other teachers or students. But when it comes to argumentation, the proviso has to be accepted. The exact same approach of course also holds for teachers of other disciplines, such as ethics or religion, and for other students like for example those who are committed to a religious or holistic worldview. Notice that this side of the coin usually seems quite normal. We are used to the conventional rule that a secular school should be protected against religious indoctrination. The other way around seems to be much more unusual: a scientistic point of view is also comprehensive doctrine and must also accept the proviso! We therefore come—from the point of view of public reason—to the conclusion that a perfect symmetry exists between scientism and other comprehensive doctrines and worldviews, when issues of public interest are discussed.

Proviso, declaration and conjecture—the three "cardinal strategies" of public reason-outline a "political" framework for classrooms, which may provide a solid and reasonable ground for cognitive and emotional growth of pupils and teachers. Therefore, it could be accepted even without any further philosophical argumentation that classrooms are in fact an important target, which should be conducted according to the idea of public reason. There are, however, some more considerations which in fact indicate that this link is much stronger, based on the argumentation, that primary and secondary schools belong to the basic structure and therefore to the public square (Zeyer 2005). It "is public reason which should guide public education. It does not merely serve the personality of the learner but—in strong contrast with Rousseau—it serves the responsibility and competence of the future citizen, who has to learn to take part in public affairs" (Oelkers 1997, p. 94). Pupils should be prepared for their role as future citizens. They should become scientifically literate, but not indoctrinated by scientism. They should be able to understand scientific free-standing arguments and to introduce them into public discourse. Yet they should also identify scientism as a comprehensive secular theory which must not be introduced into public discourse without proviso, and of course, as citizens they have the right not to be institutionally indoctrinated.

I conclude my comment by a final quotation of Cobern and Loving, which seems to gain its full depth only in the light of public reason: "…we believe that science is well deserving of distinction because it has been such a powerful tool for the accurate description of Nature and illumination of natural processes. Privilege is another matter. Science cannot answer all the questions humans want to ask; thus science can only be privileged within the boundary of its purpose. […] It is thus appropriate that educators promote a pluralistic view of knowledge: pluralism not relativism, distinction not privilege." (p. 444).

I assume that Judith could accept this without hesitation.

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## Author Biography

**Albert Zeyer** worked as a mathematics and science teacher, a medical doctor, and as a teacher educator. Currently he is a senior lecturer in science education at the Institute of Upper Secondary and Vocational Education of the University of Zurich and at the Swiss Federal Institute of Technology Zurich (ETH). His research interests are: Interdisciplinary and science education in secondary schools, education for sustainability (especially health education), and philosophy (especially applied ethics) in science education.